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(56) Documents cited

GB A 2112664

US 4309912

US 3757585

GB 0584841

US 4141251

US 3646817

EP A 0077180

US 3830108

WO A 84/00119

EP A 0067605

Note US 4309912 and GB A 2112644 are equivalent

(58) Field of search

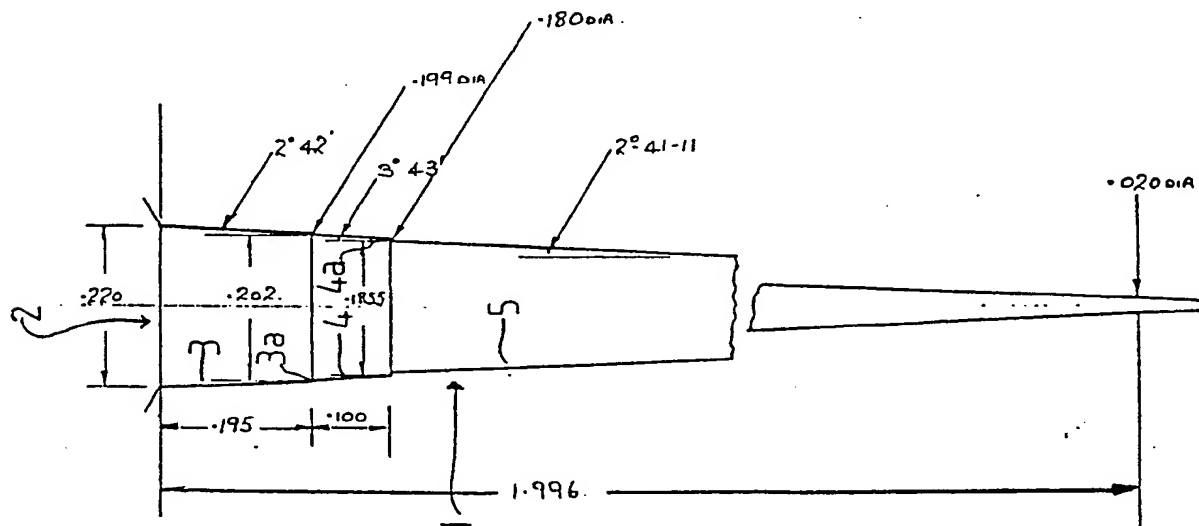
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Selected US specifications from IPC sub-class B01L

## (54) Pipetter tips for pipetters

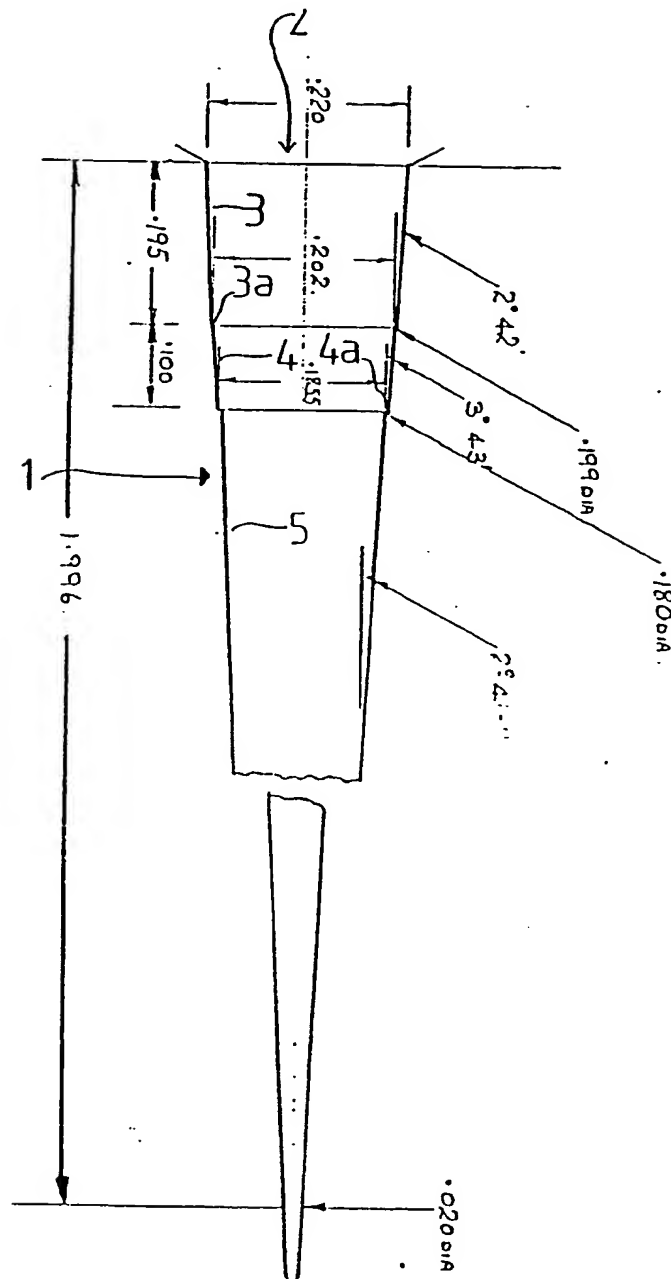
(57) Previously it has been necessary to provide a series of different tips for pipetters to allow fitment to various types and sizes of pipetters.

A pipetter tip comprises a nozzle, for fitment to one end of a pipetter, having a generally conical internal bore. The bore has three differently tapered sections with a small inwardly extending step between each section. The intermediate section has a greater angle of taper than the two end sections. In use the differently angled tapers allow the tip to fit a variety of different pipetters.



POOR QUALITY

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## SPECIFICATION

### Pipetter tips for pipetters

- 5 This invention relates to a pipetter tip for pipetters especially but not exclusively of the mechanical spring-loaded syringe type.

- 10 Pipetters are generally provided with removable tips. The tips can be changed between samples to prevent contamination. Previously however it has been necessary to provide a series of different tips to allow fitment to various types and sizes of pipetters.

- 15 According to the present invention there is provided a pipetter tip for pipetters comprising a nozzle for fitment to an end portion of a pipetter and having a generally conical internal bore wherein the angle of taper of said bore varies along the length of said bore.

- 20 Preferably the internal bore of the nozzle has a plurality of differently tapered sections each section having a constant taper along the length of the section.

- 25 Preferably also the internal bore has inwardly extending steps between each section of said taper.

Most preferably three differently tapered sections are provided for engagement with the end portion of a pipetter.

- 30 Preferably also the intermediate section of the three tapered sections has a greater angle of taper than the two end sections.

- 35 Preferably also the first tapered section has an angle of taper in the range of  $2^{\circ}$  to  $3^{\circ}$  from the longitudinal axis of the nozzle, the intermediate tapered section has an angle of taper in the range of  $3^{\circ}$  to  $4^{\circ}$  from the longitudinal axis of the nozzle and the third tapered section has an angle of taper in the range of  $2^{\circ}$  to  $3^{\circ}$  from the longitudinal axis of the nozzle.

Most preferably the angles of taper of the three sections are  $2^{\circ}42'$ ,  $3^{\circ}43'$  and  $2^{\circ}41'11''$  respectively.

- 45 Preferably also the nozzle is 1.996 inches in length with the first tapered section extending 0.195 inches along the nozzle and tapering from a diameter of 0.220 inches to a diameter of 0.202 inches, the intermediate tapered section extending 0.100 inches along the nozzle and tapering from a diameter of 0.199 inches to a diameter of 0.1855 inches and the third tapered section extending along the remainder of the nozzle and tapering from a diameter of 0.180 inches to a diameter of 0.020 inches.

Preferably also the nozzle is of a polypropylene material.

- 60 An embodiment of the present invention will now be described, by way of example, with reference to the accompanying drawing which is a part cut away sectional side view of a pipetter tip for pipetters in accordance with the present invention.

- 65 Referring to the drawing, a pipetter tip for a pipetter is in the form of a nozzle 1 and has a

generally conical external shape. The nozzle has an internal bore 2 which has a first tapered section 3, an intermediate tapered section 4 and a third tapered section 5.

- 70 The nozzle has an overall length of 1.996 inches with the first tapered section 3 being 0.195 inches long, the intermediate tapered section 4 being 0.100 inches long and the third tapered section being 1.701 inches long.

- 75 The dimensions given with reference to the drawing are manufacture dimensions and subject to material shrinkage of 0.18 inches per inch.

- 80 The first tapered section 3 has an angle of taper of  $2^{\circ}42'$ , and decreases in diameter along its length from 0.220 inches to 0.202 inches. The bore 2 has a first step 3a between the first tapered section 3 and the intermediate tapered section 4 which reduces the diameter at the upper part of the intermediate tapered section 4 to 0.199 inches in diameter. The intermediate tapered section 4 has an angle of taper of  $3^{\circ}43'$  and decreases in diameter along its length to 0.1855 inches.

- 90 The bore 2 has a second step 4a between the intermediate tapered section 4 and the third tapered section 5 which reduces the diameter at the upper part of the third tapered section to 0.180 inches in diameter. The third tapered section 5 has an angle of taper of  $2^{\circ}41'11''$  and decreases in diameter along its length to 0.020 inches.

- 95 The nozzle is manufactured from a polypropylene material which, for sterilisation purposes, is autoclavable and irradiatable, without distortion or degradation.

- 100 In use the nozzle 1 can be easily affixed to the end of a pipetter tube with the end of the pipetter sealably engaging with one of the tapered sections 3, 4 and 5 in the bore 2 of the nozzle 1.

The tip allows samples to be taken easily with the pipetter and can be easily changed between samples to prevent contamination.

- 110 The actual angles of the tapers are arranged such that they are sufficiently close to the angle of taper of the end portions of many common pipetters to provide a good seal but not so close as to produce an interference fit which would make the tip difficult to remove from the pipetter.

Examples of pipetters which the tip fits are, among others, pipetters manufactured by:

- 120 BCL  
Brand  
Costar  
Centaur  
Eppendorf  
Elkay  
125 Finnpiptette  
Flow  
Gilson  
Gordon-Keeble  
Labora  
130 MLA

Soccorex  
Unipette  
Volac  
Wheaton

- 5 Modifications and improvements may be made without departing from the scope of the invention.

#### CLAIMS

- 10 1. A pipetter tip for pipetters comprising a nozzle for fitment to an end portion of a pipetter and having a generally conical internal bore wherein the angle of taper of said bore varies along the length of said bore.
- 15 2. A pipetter tip as claimed in Claim 1, wherein the internal bore of the nozzle has a plurality of differently tapered sections each section having a constant taper along the length of the section.
- 20 3. A pipetter tip as claimed in Claim 2, wherein the internal bore has inwardly extending steps between each section of said taper.
4. A pipetter tip as claimed in Claim 2 or 3, wherein three differently tapered sections
- 25 are provided for engagement with the end portion of a pipette.
5. A pipetter tip as claimed in Claim 4, wherein the intermediate section of the three tapered sections has a greater angle of taper
- 30 than the two end sections.
6. A pipetter tip as claimed in Claim 5, wherein the first tapered section has an angle of taper in the range of  $2^{\circ}$  to  $3^{\circ}$  from the longitudinal axis of the nozzle, the intermediate
- 35 tapered section has an angle of taper in the range of  $3^{\circ}$  to  $4^{\circ}$  from the longitudinal axis of the nozzle and the third tapered section has an angle of taper in the range of  $2^{\circ}$  to  $3^{\circ}$  from the longitudinal axis of the nozzle.
- 40 7. A pipetter tip as claimed in Claim 6, wherein the angles of taper of the three sections are  $2^{\circ}42'$ ,  $3^{\circ}43'$  and  $2^{\circ}41'11''$  respectively.
8. A pipetter tip as claimed in any one of
- 45 Claims 4 to 7, wherein the nozzle is 1.996 inches in length with the first tapered section extending 0.195 inches along the nozzle and tapering from a diameter of 0.220 inches to a diameter of 0.202 inches, the intermediate tapered
- 50 section extending 0.100 inches along the nozzle and tapering from a diameter of 0.199 inches to a diameter of 0.1855 inches and the third tapered section extending along the remainder of the nozzle and tapering from
- 55 a diameter of 0.180 inches to a diameter of 0.020 inches.
9. A pipetter tip as claimed in any one of the preceding Claims, wherein the nozzle is of a polypropylene material.
- 60 10. A pipetter tip substantially as hereinbefore described with reference to the accompanying drawing.

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